Name: Date:

Polynomial Factoring solution (version 632)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 + 12x + 63 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(12) \pm \sqrt{(12)^2 - 4(1)(63)}}{2(1)}$$

$$x = \frac{-(12) \pm \sqrt{144 - 252}}{2(1)}$$

$$x = \frac{-12 \pm \sqrt{-108}}{2}$$

$$x = \frac{-12 \pm \sqrt{-36 \cdot 3}}{2}$$

$$x = \frac{-12 \pm 6\sqrt{3}\, i}{2}$$

$$x = -6 \pm 3\sqrt{3}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $6 + 3i$ and $4 + 9i$ in standard form ($a + bi$).**

Solution

$$(6 + 3i) \cdot (4 + 9i)$$

$$24 + 54i + 12i + 27i^2$$

$$24 + 54i + 12i - 27$$

$$24 - 27 + 54i + 12i$$

$$-3 + 66i$$

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3. **Write function $f(x) = x^3 - 9x^2 + 20x - 12$ in factored form. I'll give you a hint: one factor is $(x - 6)$.**

Solution

	1	-9	20	-12
6		6	-18	12
	1	-3	2	0

$$f(x) = (x-6)(x^2 - 3x + 2)$$

$$f(x) = (x-6)(x-2)(x-1)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = -(x+5)^2 \cdot (x+1)^2 \cdot (x-2)$$

Sketch a graph of polynomial $y = p(x)$.